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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MALKOWSKI, KENNETH J	
ART UNIT	**PAPER NUMBER**
2613	

DATE MAILED: 09/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,228	ARONSON ET AL.	
	Examiner	Art Unit	
	Kenneth J. Malkowski	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8, 15-17 and 20-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,075,634 to Casper et al in view of U.S. Patent Application Publication No. 2003/0011847 to Dai et al. and further in view of U.S. Patent Application Publication No. 2003/0053170 to Levinson et al.

With respect to claims 1, 15 –16 and 20-21 Casper discloses an optical transceiver module (column 1lines 55-58 (fiber optic transponder containing a transceiver unit)), having a serial (column 1 lines 16-22 (serialized digital data))(column 2 lines 4-9 (highly precise serial data signal)) electrical interface with an electrical output port and an electrical input port, for receiving and transmitting signals, the transceiver module comprising (column 1 lines 55-58 (opto-electric converter-receiver; electro-optic converter transmitter)):

a receive path comprising: an optical input port for receiving a first optical signal from external to the transceiver module (12, Fig 1)(column 1 lines 55-58 (opto-electronic converter receiver coupled from an incoming optical fiber (16, Fig 1))).

a receiver eye opener for retiming and reshaping a first serial (column 1 lines 16-22 (serialized digital data))(column 2 lines 4-9 (highly precise serial data signal)) electrical data stream based on the first optical signal (column 2 lines 3-12 (output of opto-electric receiver is

reshaped and retimed))(column 5 lines 5-10 (regenerated signal has optimally open eye pattern))(column 4 lines 52-67 (CDR is used in both transmit and receive paths wherein the CDR retimes and removes amplitude noise))

and an electrical output port of the serial electrical interface for transmitting the retimed and reshaped first serial (column 1 lines 16-22 (serialized digital data))(column 2 lines 4-9 (highly precise serial data signal)) electrical data stream to the transceiver module (30, Fig 1)(30, Fig 2 (shows electrical data "from CDR (36)" input to electrical output port (40) for external purposes from DFB laser (60)) ;

and a transmit path comprising: an electrical input port of the serial electrical interface for receiving a second serial (serialized digital data))(column 2 lines 4-9 (highly precise serial data signal)) electrical data stream from the transceiver module (Fig 3)(90 Fig 1 (fiber optic receiver))(column 5 lines 49-64 (converter receiver converts incoming optical data signals from optical fiber (102) into electrical signals)).

a transmitter eye opener for retiming and reshaping the second serial (serialized digital data))(column 2 lines 4-9 (highly precise serial data signal)) electrical data stream based on the first optical signal column 5 lines 1-10 (regenerated signal has optimally open eye pattern))(column 4 lines 52-67 (CDR is used in both transmit and receive paths wherein the CDR retimes and removes amplitude noise))

and an optical output port for transmitting a second optical signal to external to the transceiver module, the second optical signal based on the retimed and reshaped second serial (serialized digital data))(column 2 lines 4-9 (highly precise serial data signal)) electrical data

stream (13 Fig 1)(column 4 lines 20-29). However, Casper fails to disclose the receiver eye opener having an adaptive equalizer located in the receive path or transmit path. Dai, from the same field of endeavor discloses a method and apparatus for adaptive distortion compensation in optical fiber communication networks (title). Dai teaches an adaptive transceiver (page 3 paragraph 30) containing adaptive receivers and transmitters (page 2 paragraph 24) used in high speed data transmission of 10 Gb/s or higher (page 2 paragraph 21) including a receiver eye opener (CDR) having an adaptive equalizer embedded in CDR circuitry (page 2 paragraph 26 (decision feedback equalizer embedded in clock and data recovery circuitry (hereinafter CDR)))(page 3 paragraph 31 (adaptive equalizer, eye opening measurement circuit)). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method and apparatus of implementing adaptive electronic equalizer in eye opener circuitry as taught by Dai in the eye-opening receiver/transmitter circuitry taught by Casper. The motivation for doing so would have been to provide integrated apparatus and methods for adaptively compensating for dispersion impairment due to polarization mode dispersion, chromatic dispersion and the like, thereby enabling high-speed optical data transfer with minimal transmission errors (Dai: page 2 paragraph 22). Furthermore it is advantageous to implement said electronic equalizer into said CDR because of ease of integration as well as a relatively low incremental cost (Dai: page 3 paragraph 36)).

Furthermore, Although Casper in view of Dai do disclose a serial interface with a serial electrical input port (serial electrical data enters long distance CDR 140 shown in Figure 4)("serial data out to CDR 140", Figure 3) and an electrical output port (serial electrical data exits Gigabit Ethernet CDR 21 shown in Figure 4)("serial data in from CDR 21", Figure 3),

Casper in view of Dai fail to specifically disclose that the serial data stream to and from external to the transceiver module is electrical as is claimed in claim 1. Rather, Casper in view of Dai disclose the serial data stream to and from external to the transceiver module is optical. However, transmitting serial electrical data externally from a transceiver module and receiving external serial electrical data is notoriously well known in the art and is commonly used. Levinson, from the same field of endeavor discloses an optoelectronic transceiver (page 1 paragraph 2) which has an electrical serial interface including an electrical output port for transmitting serial electrical data to external to the transceiver module ("data to host device" noted as "serial data" shown in Figure 2A) and an electrical input port for receiving a second electrical data stream from external to the transceiver module ("data from host device" noted as "serial data" shown in Figure 2A)(702, electrical interface, Figure 7A)(page 6 paragraph 64 (electrical interface 702 couples a host device to the transceiver)). Therefore, it would have been obvious to one of ordinary skill in the art to electrically interface the transceiver as taught by Casper in view of Dai such that signals external to the transceiver are in electrical form as is taught by Levinson. The motivation for doing so would have been to be able to implement the advantages of the transceiver as taught by Casper in view of Dai in a host device. The method as taught by Levinson also satisfies a need for a highly flexible interface between an optoelectronic device and a host device (Levinson: page 1 paragraph 7).

With respect to claims 2 and 22, Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 1 wherein the adaptive equalizer comprises a decision feedback equalizer (Dai: page 2 paragraph 26 (decision feedback equalizer embedded in CDR decision circuitry)).

With respect to claims 3 and 23, Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 1 wherein the adaptive equalizer comprises a feed forward filter (Dai: Fig 2)(Dai: page 4 paragraph 52 (feed forward equalizer)).

With respect to claims 4, 17 and 24 Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 1 wherein the receiver eye opener further comprises a clock and data recovery (CDR) unit for recovering a clock signal from the first serial electrical data stream (Casper: column 2 lines 3-20 (low-jitter clock is derived for retiming data and removing amplitude noise))(Casper: column 4 lines 46-60 (column 4 lines 52-67 (CDR is used in both transmit and receive paths wherein the CDR retimes and removes amplitude noise))(Casper: 140, 21 Fig 1) and coupled to transmit the clock signal to the adaptive equalizer (Dai: page 2 paragraph 26 (decision feedback equalizer is embedded in clock and data recovery (CDR) circuitry with adaptively adjustable thresholds and sample time).

With respect to claims 5, 6 and 25 Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 4 wherein the CDR unit is located external to the receive path and recovers the clock signal from the first serial electrical data stream before retiming and reshaping (Fig 4)(Casper: column 2 lines 3-20 (wherein low-jitter clock derived from serial data is used *for* retiming Gigabit Ethernet data and removing amplitude noise)).

With respect to claims 7 and 26, Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 4 further comprising a retiming (RT)(Dai: 91, Fig 4) unit wherein: the adaptive equalizer, the CDR unit and the RT unit are coupled in series in the receive path for the first serial electrical data stream (Dai: electrical data from PD (11, Fig 1) is

sent to equalizers (13,14 Fig 1) and CDR (17, Fig 1) which are shown in series)); and the CDR unit is further coupled to transmit the clock signal to the RT unit (In both Dai and Casper, the CDR unit and RT unit are coupled together and share the clock signal as they are parts of the same unit (Casper: column 2 lines 6-9) (Dai: Fig 4 is CDR module with RT unit (91, Fig 4) coupled to circuitry in order to receive clock signal (page 5 paragraphs 61-62))).

With respect to claims 8 and 27, Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 1 further comprising: a coefficient module coupled to receive the first serial electrical data stream (Dai: page 1 paragraph 9 (data in regeneration section is electrical)) and to transmit coefficients to the adaptive equalizer (Dai: page 5 paragraph 58 (decision feedback equalizer (DFE), original signal and output of each tap is multiplied by coefficients c(0)-c(k)))(Dai: Fig 3)(Dai: page 4 paragraph 53 (gain controlled by coefficients))(Dai: page 3 paragraph 34 error detection circuit measures data eye opening in time and amplitude domains...for compensation and other purposes).

3. Claims 9-11, 18-19 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,075,634 to Casper et al in view of U.S. Patent Application Publication No. 2003/0011847 to Dai et al. and further in view of U.S. Patent Application Publication No. 2003/0053170 to Levinson et al. and further in view of U.S. Patent No. 6,469,782 to Schaepperle

With respect to claims 9, 19 and 28 Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 8, however, coefficients are based on convolution rather than autocorrelation functions (page 4 paragraph 53)(72, Fig 3 shows convolution formula). Although convolution is similar to autocorrelation, Casper in view of Dai does not use specifically use autocorrelation. Schaepperle, from the same field of endeavor,

discloses an electrical adaptive equalizer (column 1 lines 34-38 (rapid, adaptive electronic equalization of optical signals) used to aide in opening an eye diagram for the purpose of improving transmission characteristics (column 1 lines 38-42). Schaepperle teaches said equalizer using calculated coefficients wherein the coefficients are based on autocorrelation functions of the first serial electrical data stream (column 2 lines 42-60 (autocorrelation function, parameters are used to calculate coefficients of an adaptive transversal filter for equalizing PMD-distorted signal)(Figures 2-4)(Fig 3 shows an optical receiver that converts optical data to electrical data (11, Fig 3) prior to equalization)). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method and apparatus used to create coefficients based on autocorrelation functions as taught Schaepperle rather than convolution within the adaptive equalizer as taught by Casper in view of Dai and further in view of Levinson. The motivation for doing so would have been to very rapidly detect the two parameters of the polarization mode dispersion, even in the event of strong signal distortion (Schaepperle: page 1 lines 35-42).

With respect to claims 10-11, 18 and 29-30 Casper in view of Dai and further in view of Levinson disclose the transceiver module of claim 8 further comprising: at least two analog correlation modules (Fig 3)(page 5 paragraph 58 (adaptive gain controls can be performed in analog or digital domain)), each for calculating an function of the first serial electrical data stream, wherein the coefficients are based on the calculated functions (Fig 3 shows calculated coefficients c(0)-c(k)). However, Casper in view of Dai and further in view of Levinson fails to disclose basing the coefficients on autocorrelation functions. Schaepperle, from the same field of endeavor, discloses an electrical adaptive equalizer (column 1 lines 34-38 (rapid, adaptive

electronic equalization of optical signals) used to aide in opening an eye diagram for the purpose of improving transmission characteristics (column 1 lines 38-42). Schaepperle teaches said equalizer using calculated coefficients wherein the coefficients are based on autocorrelation functions of the first serial electrical data stream (column 2 lines 42-60 (autocorrelation function, parameters are used to calculate coefficients of an adaptive transversal filter for equalizing PMD-distorted signal)(Figures 2-4)(Fig 3 shows an optical receiver that converts optical data to electrical data (11, Fig 3) prior to equalization)). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method and apparatus used to create coefficients based on autocorrelation functions as taught Schaepperle rather than convolution within the adaptive equalizer as taught by Casper in view of Dai and further in view of Levinson. The motivation for doing so would have been to very rapidly detect the two parameters of the polarization mode dispersion, even in the event of strong signal distortion (Schaepperle: page 1 lines 35-42).

4. Claims 12-14 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,075,634 to Casper et al. in view of U.S. Patent Application Publication No. 2003/0011847 to Dai et al. and further in view of U.S. Patent Application Publication No. 2003/0053170 to Levinson et al. and further in view of U.S. Patent Application Publication No. 2002/0060824 to Liou et al.

With respect to claims 12-14 and 31-32, Casper in view of Dai and further in view of Levinson discloses the transceiver module of claim 1 wherein serialized digital data can achieve relatively high data rates (column 1 lines 16-30 (serialized digital data, 1Gb/s or higher)(column 2 lines 4-9 (highly precise serial data signal)), however Casper fails to specifically disclose said

serial electrical data stream achieving a data rate of 10 Gb/s or faster. Liou, from the same field of endeavor discloses a transceiver module that is substantially similar to the module as disclosed by Liou. Liou teaches said module wherein the first serial electrical data stream had a data rate of 10 Gb/s or faster (page 3 paragraph 24)(page 1 paragraph 6). At the time of invention it would have been obvious to one skilled in the art to replace the DFB laser used in the transmission system as taught by Casper with the electro-absorption modulated FP laser as taught by Liou. The motivation for doing so would have been to achieve a data stream rate of 10 Gb/s and to achieve a superior transmission characteristic exemplified by the eye diagram model (Liou: Page 1 paragraph 6)(Liou: page 3 paragraph 24). Within a system that achieves a serial data stream rate of 10 Gb/s said transceiver module inherently comprises a 10-Gigabit compliant transceiver module and a 10 Gb/s serial electrical interface.

Response to Arguments

5. Applicant's arguments with respect to claims 1-32 have been considered but are moot in view of the new ground(s) of rejection. It is important to note that the assertion by applicant on page 11 paragraph 1 is incorrect. Applicant states that, "Casper does not teach or suggest a serial electrical interface with an electrical output port and an electrical input port." However Casper does teach such an interface with an electrical input port (serial electrical data enters long distance CDR 140 shown in Figure 4)("serial data out to CDR 140", Figure 3) and an electrical output port (serial electrical data exits Gigabit Ethernet CDR 21 shown in Figure 4)("serial data in from CDR 21", Figure 3). Nevertheless, the claim 1 has been amended in order to meet the limitation that the electrical signals are from external to the transceiver module.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Malkowski whose telephone number is (571) 272-5505. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KJM 8/23/06

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER